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ABSTRACT

Equipment and programs related to a system of telecommunications for vocational education in Utah were developed and pilot tested. These developments were in response to a need for applying the use of microcomputers in instruction, administration, and training programs. Specific objectives of the project were clerical and staff use of microcomputers, personnel send and receive data files, district personnel send and receive messages from state office, state office personnel access large databases and national computer networks, district personnel remotely access University of Utah computer, and participation in audio conferencing and statewide telecommunication. Project products made available were an autotutorial diskette for microcomputer use, telecommunications network, and integration of the vocational network with larger networks and databases. It was recommended that the Utah State Office of Education, Vocational Education Division, exert vigorous leadership; use microcomputers in collection, processing, and distribution of data; provide training programs; introduce clerical staff to microcomputers; establish an electronic mail network; utilize and build the Utah ERIC to better suit vocational education; and link the Utah Network to national vocational education resources. (Project materials are appended.) (YLB)

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END OF PROJECT REPORT

PROJECT TITLE: Creation of a Telecommunications Network for Vocational Education in Utah

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LOG NUMBER: 2001

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DATE FINAL REPORT SUBMITTED: 30 June 1982

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U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
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TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

END OF PROJECT REPORT

TITLE: Creation of a Telecommunications Network for Vocational Education in Utah

I. RESPONSE TO NEED STATEMENT.

1. INSTRUCTIONAL USE. Currently there are large numbers of microcomputers in use by public schools throughout the State of Utah. In many cases they are being used effectively, but in many instances they are being under utilized or misused. This is true in vocational education as well as in other areas of the curriculum.

A large amount of information is presently available that describes the application of microcomputers to various aspects of vocational education. This information comes from many diverse sources such as presentations at national and state conventions, professional journals and popular periodicals. It is extremely difficult and time consuming to attempt to locate and review this information. It would be extremely valuable to those interested in this area to have an easily accessible database to rely on for summary information as it concerns microcomputer applications in vocational education.

Many projects utilizing microcomputers are currently underway within the State of Utah and nationally. At present, there is no systematic means to identify these

projects and utilize their findings. Typically, these projects are unknown outside the district or even the school. Having information on these projects could be very valuable to persons utilizing microcomputers in vocational education.

In addition, having an easily accessible database of information on currently available microcomputer software for vocational education applications would be a valuable resource. This could provide information on the availability, user requirements, cost and quality of the software. All of the foregoing information could be used advantageously by local education agency staff to help design and effectively implement microcomputer technology in vocational programs.

2. ADMINISTRATIVE USE. One of the fundamental problems of providing vocational education is the management of information. The collection, organization, analysis, reporting and using information demands tireless attention and investment of time. It is a complex obligation of imposing imprtance.

One of the realities of life in vocational education, however, is that information determines funding, guides administrative decisions, and coordinates instruction. For both teachers and administrators in vocational education, the management of information is both frustrating and burdensome. The so-called "bubble sheets" have become the bane of existence for many in the local districts as well as for those in the State Education Agency. The manual maintenance of large quantities of information is slow, cumbersome and inefficient. The use of large computers without close control and flexibility has not solved the management of information in vocational education. If information is late, disorganized, or lacks clarity, or if it is poorly maintained it is usually poorly

utilized and not functional. When utilized efficiently, information does well in directing services of vocational education and confirming the efficacy of results.

An obvious solution to the problem of information management in vocational education at the state and local levels is the use of the microcomputer. They offer an unparalleled opportunity to develop useful, economical and broadly received instructional and management systems. Because of recent technological developments, microcomputer applications hold great promise for vocational education.

3. TRAINING PROGRAMS. A major problem encountered by persons interested in educational applications of the microcomputer and its peripheral systems is the nonavailability of training. The various computer fairs and vendor demonstrations are useful to generate interest but provide little taining in the actual use of microcomputers. A few isolated workshops are offered occasionally but only a very small portion of interested school staff attend these since the participants are required to travel to the workshop. There is a strong need for a continuing training program that can be used with State School Office personnel as well as taken to the local school districts. This appears to offer the greatest amount of training with relatively small travel requirements.

II. THE OBJECTIVES AND THEIR ATTAINMENT. This project attempted to accomplish the following objectives with an 80 percent level of success, as shown by confidential interviews in 12 target centers throughout the State:

1. CLERICAL AND STAFF USE OF MICROCOMPUTER. While several attempts were made to broaden the participation in the project, actually only one secretarial staff member in

the Vocational Education Division was trained to a level of proficiency in the use of microcomputers and peripheral systems.

2. PERSONNEL SEND AND RECEIVE DATA FILES. Advances in microcomputer technology now make it possible for information to be easily accessed, stored, duplicated, manipulated and transferred from one computer to another electronically. This eliminates the need for cumbersome paperwork and volumious filing cabinets, etc. With the microcomputer and access to the telephone lines, applications such as word and number processing, data storage and retrieval, linkage to large computer networks, electronic mail and data transfer are now within the reach of small organizations and individuals.

While this project attempted to multiply the number of users with frequent demonstrations, there were only a series of successful transmissions of data to and from the State School Office and external schools and private offices.

3. DISTRICT PERSONNEL SEND AND RECEIVE MESSAGES FROM STATE OFFICE. This objective was carried out but with the involvement of a limited number of personnel involved. The accomplishments included:

a. Chatting between microcomputers (full duplex communication on line).

b. Creating messages, printing hard copies, storing to disc, and transferring to another microcomputer.

c. Receiving messages from another microcomputer, saving the information to disc, and printing hare copies.

d. Transferring word-processing files (Applewriter).

e. Transferring numerical processing files (Visicalc).

4. STATE OFFICE PERSONNEL ACCESS LARGE DATA BASES AND NATIONAL COMPUTER NETWORKS. Using the Apple II microcomputer together with a micromodem (both D C. Hayes and Applecat II types), it was demonstrated on a number of occasions the manner of accessing through telephone lines the huge ERIC data bases maintined by Lockheed on the west coast and BRS on the east coast. Both services provide literally dozens of data bases and provide immediate hard copy or off-line delayed copy at minimal charge.

5. DISTRICT PERSONNEL REMOTELY ACCESS UNIVERSITY OF UTAH COMPUTER. In order to illustrate the easy access of the microcomputer to a large locally based computer, frequent contact was made with the University of Utah computer. This service is extremely inexpensive for educational organizations and is operated for 24 hours per day, 7 days a week.

6. PARTICIPATION IN AUDIO CONFERENCING AND STATEWIDE TELECOMMUNICATION. Initially it was thought to be advantageous to set up a statewide network for audio conferencing to supplement a telecommunications network. The prototype for such a network was found in operation by the Eastern Montana College at Billings. This college has

addressed the problem of educational outreach to remote areas by successfully operating the Educational Telecommunications System for a period of two years.

This project did not implement the Montana prototype. Instead, the project established a Utah ERIC which could be remotely operated by microcomputers anywhere within the State of Utah. This system was established with a number of pilot try-outs. A microcomputer software program is currently being developed that will enhance the Utah ERIC system by making the system simpler, more easily retrievable, and allowing its use on a hard disc over telephone lines from anywhere in the State or nation.

III. PROJECT DELIVERABLES. At the conclusion of this project a number of products were to be made available to Vocational Education Division of the Utah State Office of Education. These products are:

1. AUTOTUTORIAL DISKETTE FOR MICROCOMPUTER USE. A self teaching diskette has been developed by Worldwide. This diskette allows a person to be self-taught on the basic parts of a microcomputer. Other commercial software designed to accomplish the same objectives has become available during the time this project has been underway.

2. TELECOMMUNICATIONS NETWORK. It was hoped that a regular network of microcomputers would be interrelated and functioning at the conclusion of this project. Such a network would make functional the sending and receiving of messages, electronic mail, the gathering and processing of needed vocational education data from throughout the State, remote access to schools, technical schools and colleges, and area vocational schools so that neeeded could be quickly and efficiently obtained, processed and used in

decision making.

3. INTEGRATION OF VOCATIONAL NETWORK WITH LARGER NETWORKS AND DATABASES. While an integration of a prototype of a vocational education network of microcomputers has been piloted, the network has never been established. The hardware -- microcomputers, modems, printers, monitors, etc. -- are available and so is the software -- data capture, on-line protocol diskettes, storage and retrieval programs, etc. What is lacking now, and seemed to be lacking during this project, was the will of vocational educators to learn how to operate microcomputers and participate in the networking activities.

IV. RECOMMENDATIONS. On the basis of the experimentation and pilot-testing of equipment and programs related to a system telecommunications for vocational education in Utah, the following recommendations are made:

1. EXERT VIGOROUS LEADERSHIP. In a coordinated effort with other divisions of the Utah State Office of Education, the Vocational Education Division should exercise aggressive leadership setting up an information center and clearinghouse for applications of microcomputers to various aspects of vocational education. The prototype for this recommendation is the San Mateo County Superintendent's Office in Redwood City, California. This office has developed a collection of all information on microcomputer hardware which is readily available to school districts or individuals. In addition, it has a comprehensive collection of microcomputer software -- programs -- that are in the public domain. Any individual can obtain any diskette program for a flat $10 fee. Or, if the individual has developed an educational program, he can trade his

program for any other program at no cost.

2. USE MICROCOMPUTERS IN COLLECTION, PROCESSING, AND DISTRIBUTION OF DATA. Largely to gain better control and make the information more useful in decision making at all levels of education, the Vocational Education Division should rapidly shift to microcomputers for the collection, processing, and distribution of data. The collection and processing of data that now takes months could be cut to a matter of days, or at most weeks. The system would provide for immediate feedback to locals schools, colleges, centers, etc., and would eliminate the present hassle for priorities, time delays, and unnecessary clearances. Printed copies of reports, where needed, should be much simpler to produce and much of the space now taken up with

files could be eliminated.

3. PROVIDE TRAINING PROGRAMS. One of the most difficult parts of phasing microcomputers into the instructional and administrative aspects of vocational education, is motivating and training staff inservice. Age or length of service seems to be a factor. For example, younger teachers and administrators seem to welcome the shift to microcomputers. Older staff members, on the other hand tend to shy away of defer getting involved. Part of the solution to this problem is to make training readily available and help staff members make the transition on an individualized basis.

4. INTRODUCE CLERICAL STAFF TO MICROCOMPUTERS. On the basis of national experience in business, it is quite possible to double or triple the productivity of the present clerical staff in the Vocational Education Division of the USOE by introducing microcomputers in replacing typewriters and calculators with word-processors and number- processors (Note: This can be the same machine that serves both functions plus working as the electronic mail,

telecommunication device, access to huge data bases, etc.).

5. ESTABLISH AN ELECTRONIC MAIL NETWORK. What is sometimes called a "Cooperative Systems Mail Network" can be advantageously introduced into vocational education in Utah. There are, at present, two prototypes operating in Utah education that could be copied or adapted. One of these is the Utah State University Extension Service. The other is the network operated by and for special education with its resource center in an abandoned school building in Murray. The USU system has eight "computer mailboxes" which are linked to each other as well as to Washington, D.C. and 45 other states. USU claims significant advantages in cost savings, time savings, paper savings, privacy, and portability. The contact person at USU Art Higbee, extension media production specialist, or one of the "mailboxes" is in the extension center in Salt Lake City.

6. UTILIZE AND BUILD THE UTAH ERIC TO BETTER SUIT VO. ED. The networking recommended herein allows remote access to any microcomputer on the system and, therefore, with permission, permits the search and retrieval of many types of information that have been stored. At present, the Utah ERIC contains all disserations and theses from all Utah institutions that are devoted to the improvement of instruction, including vocational education. It also includes proven practices and a human resources data bank. It continues to need expansion into nonprint resources, vendors, studies, etc.

7. LINK THE UTAH NETWORK TO NATIONAL VO. ED. RESOURCES. The microcomputer linked to an inexpensive modem and then a standard telephone jack can open up worlds of new information, research, current events, and intercommunication among schools, institutions, individuals, etc. A service is available through a

Washington, D.C. telephone number that gives the latest developments in vocational education several times each day. It also provides a linkage with vocational education departments in every state. In addition, there are of course the huge data bases with banks of data on vocational education which are immediately accessible to the microcomputer.

A P P E N D I X

A. SAMPLE PROJECT LETTER TO SELECTED HIGH SCHOOLS

B. TELECOMMUNICATIONS CAPABILITIES AND RECOMMENDED EQUIPMENT AS GIVEN TO SCHOOL IN THE PROJECT

C. PROTOCOL MATERIALS USED BY THE USU TELECOMMUNICATIONS SYSTEM FOR "COOPERATIVE SYSTEMS MAIL NETWORK"

WORLDWIDE EDUCATION AND RESEARCH INSTITUTE

INTERNATIONAL HEADQUARTERS—2315 STRINGHAM AVENUE
SALT LAKE CITY, UTAH 84109
PHONE: (801) 486-6066
521-9262

October 28, 1981

Dear Sir,

As you may be aware, advances in computer technology have made it possible for information to be easily accessed, stored, duplicated, manipulated and transfered from one computer to another electronically rather than the cumbersome paperwork currently involved. With the microcomputer and access to the telephone lines applications such as word and number processing, data storage and retrival, linkage to large computer networks, electronic mail and data transfer are now within the reach of small organizations and individuals.

Worldwide Education and Research Institute in conjunction with the Utah State Office of Vocational Education is presently engaged in a project wherein twelve Vocational Education Centers and schools will be linked together to explore telecommunications using microcomputers and telephone conferencing. We would like you to participate in this project with us.

We have chosen you because there is an Apple II brand microcomputer already at your school making the hardware and software costs of your participating in this network minimal. We will be contacting you by phone to confere more with you in this regard and arrange to demonstrate the the Apple's use in telecommunications. If you would like to contact us call our office at 486-6066.

Sincerely,

Daniel Eastmond
Consultant, Worldwide

AREA OFFICE
NEW YORK OFFICE: 74 JORDAN BLVD. / DEL MAR, NEW YORK 12054 / PHONE: (518) 439-2507

VOCATIONAL EDUCATION TELECOMMUNICATIONS

October 28, 1981

The followings are a list of the abilities in telecommunication that will be demonstrated and taught to Vocational Education participants:

1. Chatting between microcomputers (full duplex communication online)

2. Create messages, print hard copy, store to disk, and transfer to another microcomputer.

3. Recieve messages from another microcomputer, save to disk, and print hard copy.

4. Transfer of word-processing files (Applewriter)

5. Transfer of numerical processing files (Visicalc)

6. Access Worldwide's RESOURCES telecommunication network

7. Access The SOURCE telecommunication network

8. Access the University of Utah basic programs.

9. Save to disk data captured on RESOURCES, The SOURCE, and University of Utah computer.

10. Redistribute information captured on disk to another microcomputer.

It is suggested that all participants in the Vocational Education Telecommunications network have the followins hardware and software.

1. Apple II microcomputer with 48k of memory, 1 disk drive, 1 printer.
2. Novation Apple Cat II modem
3. Com-Ware II (comes with above modem)
4. Applewriter and Visicalc

*NOTE- Other brands of microcomputers, modems, word-processing and numerical programs may be used with this system to some advantage. However compatible hardware and software will allow participants to be involved in all aspects of the network.

SIGNING ON TO THE COOPERATIVE SYSTEMS MAIL NETWORK VIA 800

.. Dial this telephone number : [redacted] Extension CRD
Utah

The ringing sound will change to a steady high-pitched tone. When this happens, insert the phone receiver, in the cups on the terminal. Be sure that the end of the receiver to which the cord is attached is placed in the cup on the terminal marked "cord". Somewhere on your terminal a light will come on indicating that you are on-line. Then the following events will occur:

	YOUR ACTION	SYSTEMS RESPONSE
	024356	
2.	Press the carriage return key twice ——→	TELENET 8006J Terminal =
3.	Press the carriage return key if you are using a 72-char width terminal. (type decw and press carriage return key if using a wider terminal) ——→	Your area code=
4.	Type your telephone area code. ——→	@
5.	ID(sp)[redacted](and press return) note: (sp)=space ——→	Password=
6.	053036 ——→	@
7.	Type: C(sp)[redacted](sp)[redacted](and press return) ——→ NOTE: (sp) = space	301 240 Connected Primecom Network System 51 Please sign on >
	Type in your ID, Holding the Control Key when typing your "secret" password.	
8.	Type ID(sp)[redacted](sp)[redacted] (PRESS RETURN) ——→ ID # PASSWD NOTE: (sp) = space	Primecom Network System 57 Dialcom Prime Sharing 2.9H(50) On at (Time)(Date) Last On At (Time)(Date) >
9.	Note you are now at systems level (>) and the computer is awaiting a command	
10.	Type the command MAIL ——→	SEND, READ OR SCAN
11.	To sign off, you must be at system level (>). Simply type OFF	

NOTE that you will be disconnected from your ID, but left connected to the computer. BE SURE TO HANG UP THE PHONE as well.

VISITERM FUNDAMENTALS

Dialing:

1. Press ESC, then type " (press the number 2 while holding down the SHIFT key).

2. Press ESC, then type ! (press the number 1 while holding down the SHIFT key).

3. Type C (for call)

4. Type D (to dial out)

5. Type the phone number, one digit at a time. The number is dialed as you type. Wait for each digit to appear before typing the next one. If you make a mistake, hang up by holding down CTRL and pressing Z, and begin again at step 3. When the entire number is dialed, press RETURN.

6. The modem will now wait for a carrier. If none is found after 30 seconds, it will give up, and you will have to try again.

7. When a carrier is detected, you are connected to the computer. Sign on as outlined in the sheet "SIGNING ON TO THE COOPERATIVE SYSTEMS MAIL NETWORK."

To: Sign-On Instructions

RECEIVING A MAIL MESSAGE TO AN APPLE DISK FILE

1. Enter the mail system by typing MAIL, followed by RETURN.

2. If desired, you may scan your mail by typing SCAN. To read a letter, type READ followed by the number of the desired letter. Do NOT press return yet. If you do not wish to scan your mail first, type READ, but do NOT press return.

3. Press ESC, then ! (SHIFT-1).

4. Press F (for File transfer)

5. The word FILENAME on the screen should be highlighted with inverse (black on white) letters. If it is not, press the space bar repeatedly until it is.

6. Press ESC.

7. Type in the name you would like to store the file as on the Apple disk, then press RETURN. Place the desired disk into drive 1.

8. Press R (for Receive).

9. If the file you specified already exists on the disk, VisiTerm will ask you what to do. Press A to Append the new text onto the end of the existing file. Press R to Replace the old file (any data stored in it will be lost). Or press C to Cancel receiving (to specify a new filename, then press ESC followed by the filename as above).

10. The STATUS (shown on the bottom line of the top half of the screen) should be RECEIVING. Any keys you type will be sent to the DIALCOM system.

11. Press RETURN to terminate the READ command previously entered.

12. The text of the message will appear on the Apple screen as it is received. When --More-- messages appear, press RETURN to continue.

13. When a "Disposition:" message appears, the letter is finished. To receive more than one letter into the same file, press RETURN.

14. To terminate receiving the letter into a file, press ESC, then press 2. The Apple disk will spin a minute. When it stops, press T to return to terminal mode.

HANGING UP THE MODEM

1. Be sure to sign off DIALCOM.

2. Press ESC, then ! (SHIFT-1).

3. Type C (for Call)

4. Type H (for Hang up).

5. If you wish to run the file printer program, type X (for eXecute), then type in FILE PRINTER and press RETURN.

Mail Disk Dir - UT